EXCEED
IT SYSTEMS

Software Testing

Basics

July 2022

Software Testing

- The process consisting of all lifecycle activities, both static and dynamic, concerned with planning, preparation and evaluation of a component or system and related work products to determine that they satisfy specified requirements, to demonstrate that they are fit for purpose and to detect defects.

WHY TESTING ?

- Software that does not work correctly can lead to many problems such as:
  - ✓ Delay / Loss of time
  - ✓ Futility / Loss of effort
  - ✓ Wastage / Loss of money
  - ✓ Shame / Loss of business reputation
  - ✓ Injury or death

WHY TESTING ?...

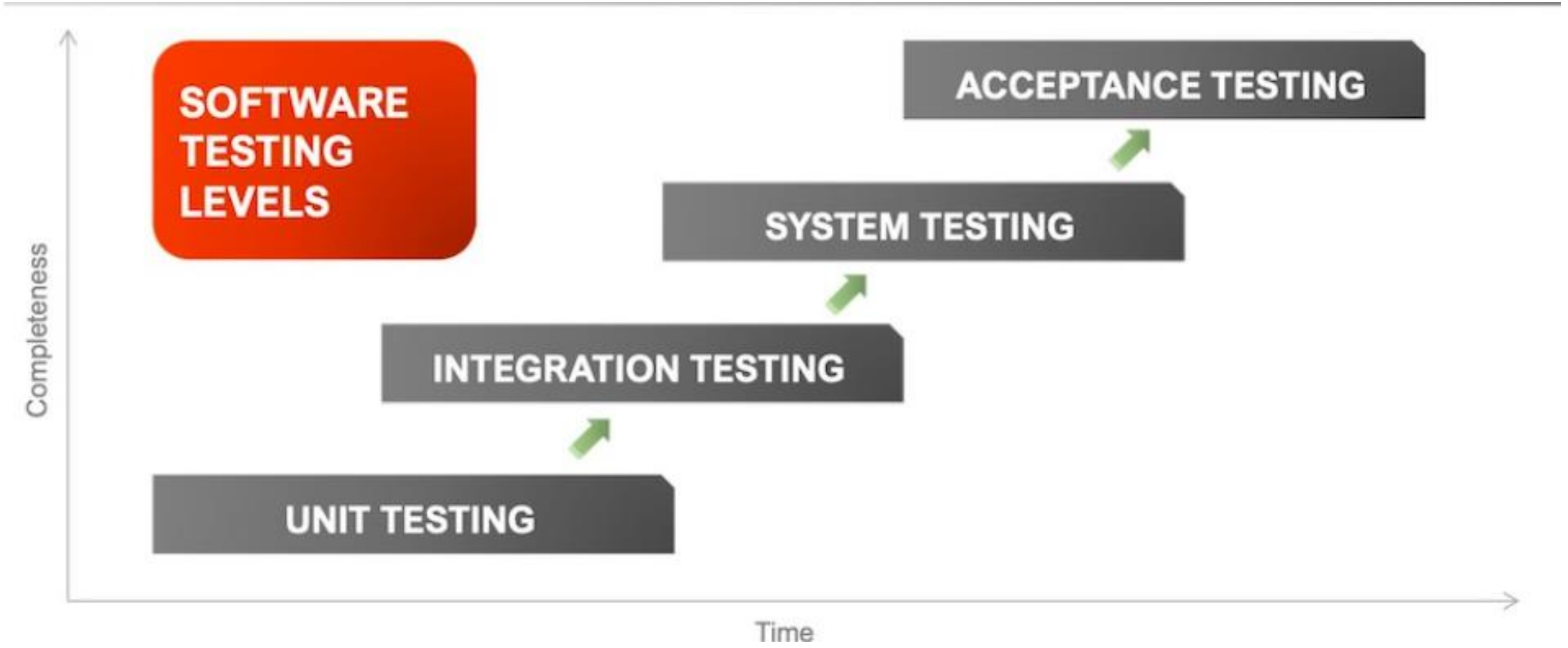
- Examples damages
  - ✓ The Mars Climate Orbiter crashed in September 1999 because of a "silly mistake": wrong units in a program.
  - ✓ The 1988 shooting down of the Airbus 320 by the USS Vincennes was attributed to the cryptic and misleading output displayed by the tracking software.
  - ✓ Death resulted from inadequate testing of the London Ambulance Service software.

https://www.cs.tau.ac.il/~nachumd/horror.html

Software Testing Goals

- **Defect Detection:** Find defects / bugs in the software during all stages of its development (earlier, the better).
- **Defect Prevention:** As a consequence of defect detection, help anticipate and prevent defects from occurring at later stages of development or from recurring in the future.
- **User Satisfaction:** Ensure customers / users are satisfied that their requirements (explicit or implicit) are met.

TESTING LEVELS



Testing Levels...

- Unit Testing:- where individual units of a software are tested to validate that each unit of the software performs as designed.
- Integration Testing:-where individual units are combined and tested as a group to expose faults in the interaction between integrated units.
- System Testing:-where a complete, integrated system is tested to evaluate the system's compliance with the specified requirements.
- Acceptance Testing:-where a system is tested for acceptability. The purpose of this test is to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery.

Testing Methods

- Static Testing:-A method of testing whereby work products are reviewed without executing them.
- Dynamic Testing:-A method of testing whereby the behavior of work products is evaluated by executing them.
- Black Box Testing:- A software testing method in which the internal structure/design/implementation of the item being tested is not known to the tester.
- White Box Testing:-A software testing method in which the internal structure/design/implementation of the item being tested is known to the tester.

Testing Methods...

- Gray Box Testing:-A software testing method which is a combination of Black Box Testing method and White Box Testing method.
- Agile Testing:- A method of software testing that follows the principles of agile software development.
- Ad Hoc Testing:-A method of software testing without any planning and documentation.
- Manual Testing:- A method of testing whereby software is tested manually (by a human)
- Automated Testing:-A method of testing whereby software is tested with the help of scripts and tools.

TESTING TYPES

- Functional Testing:-Functional Testing is a type of software testing (or a group of software testing types) whereby the system is tested against the functional requirements/ specifications.
- Smoke Testing:-Smoke Testing, also known as “Build Verification Testing”, is a type of software testing that comprises of a non-exhaustive set of tests that aim at ensuring that the most important functions work.
- Regression Testing:-Regression testing is a type of software testing that intends to ensure that changes (enhancements or defect fixes) to the software have not adversely affected it.

TESTING TYPES…

- Non-Functional Testing:- Non-functional testing is a group of software testing types whereby the system is tested against the non-functional requirements like usability, performance, security and compliance.
- Usability Testing:-Usability Testing is a type of software testing done from an end-user's perspective to determine if the system is easily usable.
- Performance Testing:- Performance Testing is a type of software testing that intends to determine how a system performs in terms of responsiveness and stability under a certain load.

TESTING TYPES...

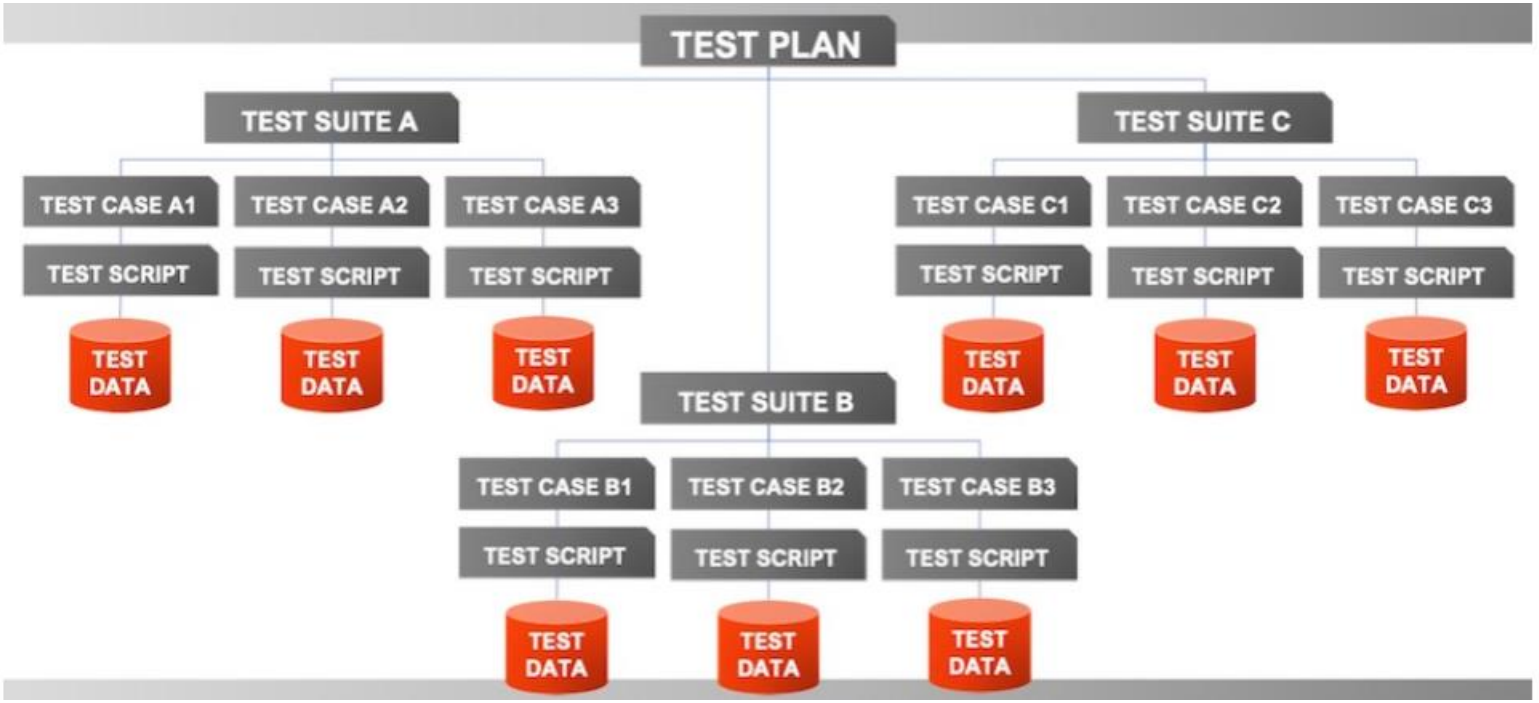
- Security Testing:-Security Testing is a type of software testing that intends to uncover vulnerabilities of the system and determine that its data and resources are protected from possible intruders.
- Compliance Testing:-Compliance Testing [also known as conformance testing, regulation testing, standards testing] is a type of testing to determine the compliance of a system with internal or external standards

DISTINCTION

- Level = WHEN to test
- Method = HOW to test
- Type = WHAT to test

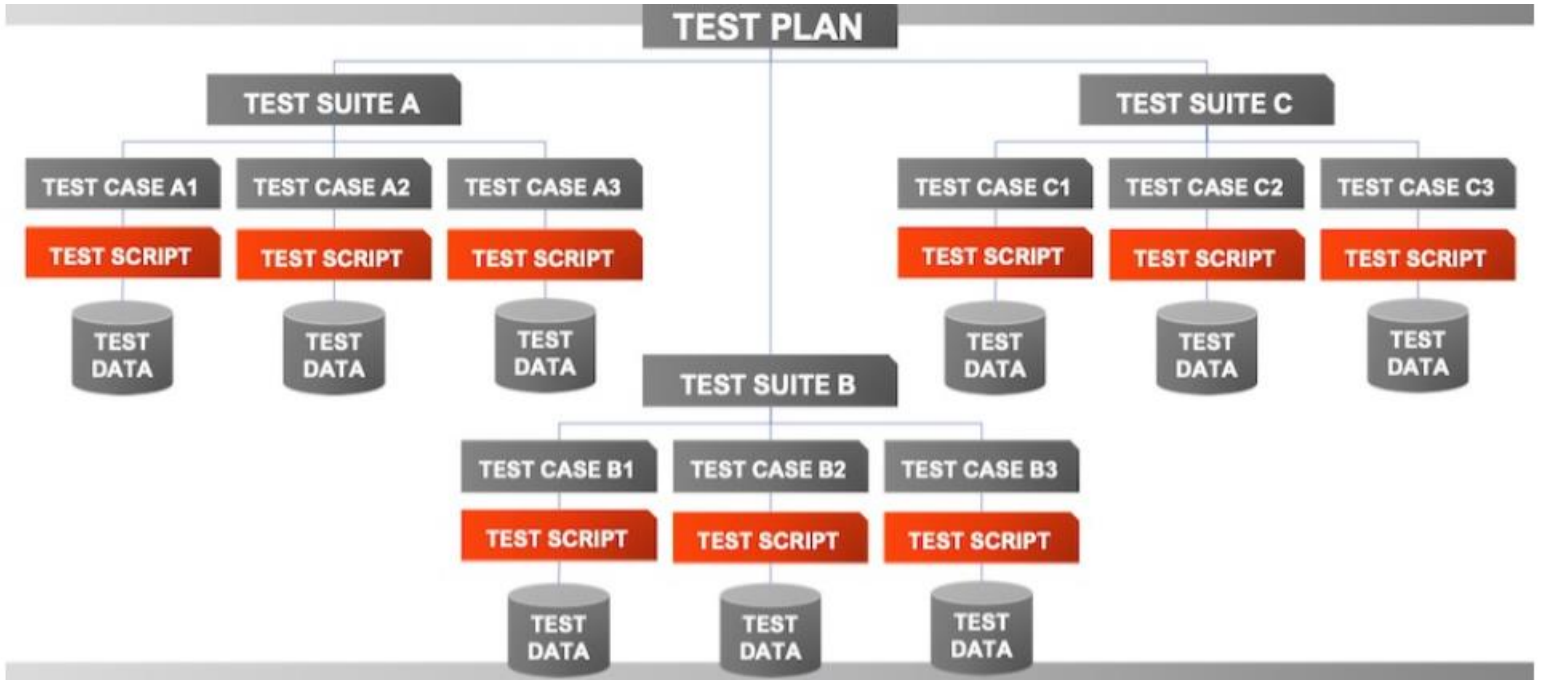
TEST ARTIFACTS

- TEST DATA is data used in software test execution. The data can be preloaded in the system or input by the tester or test automation



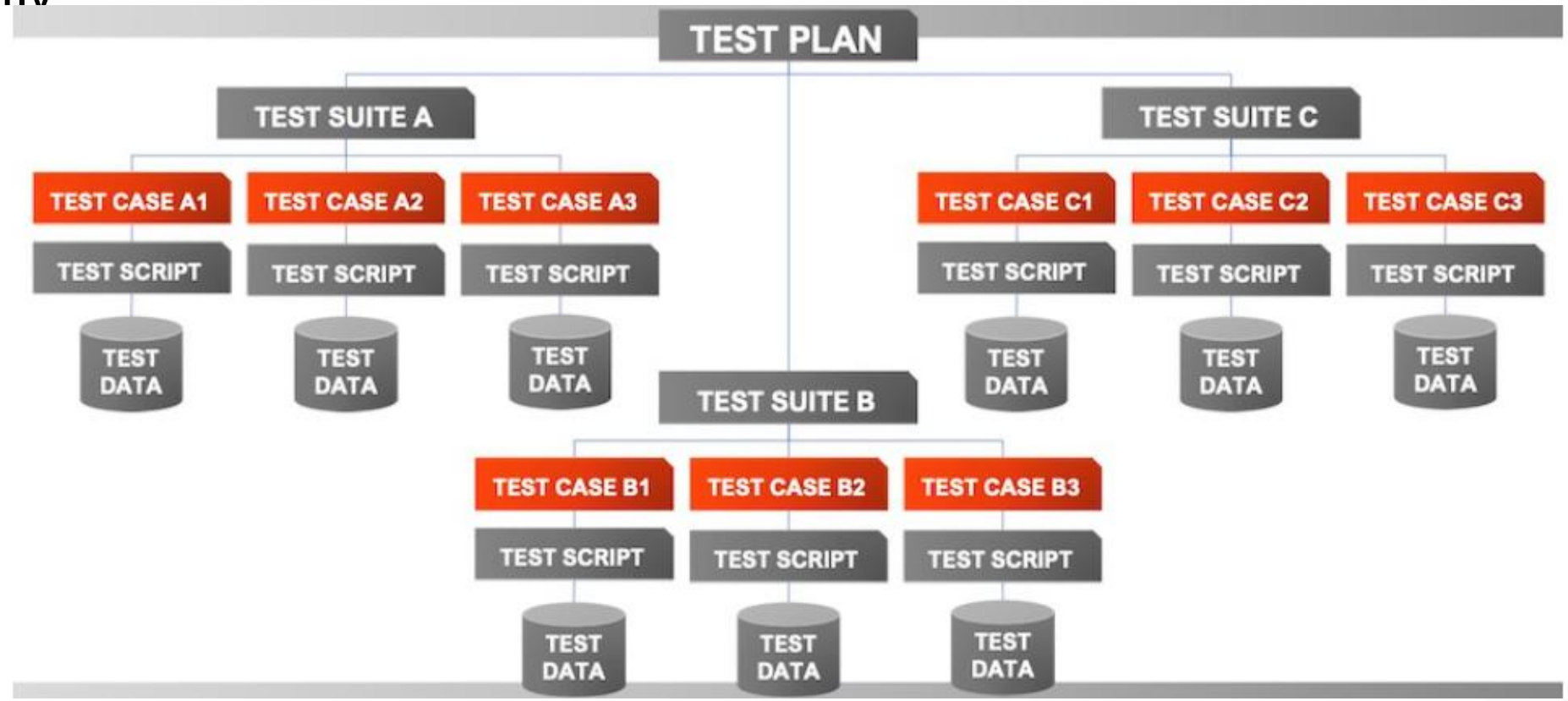
TEST ARTIFACTS

- A TEST SCRIPT is a set of instructions that is performed on a system under test to verify that the system performs as expected



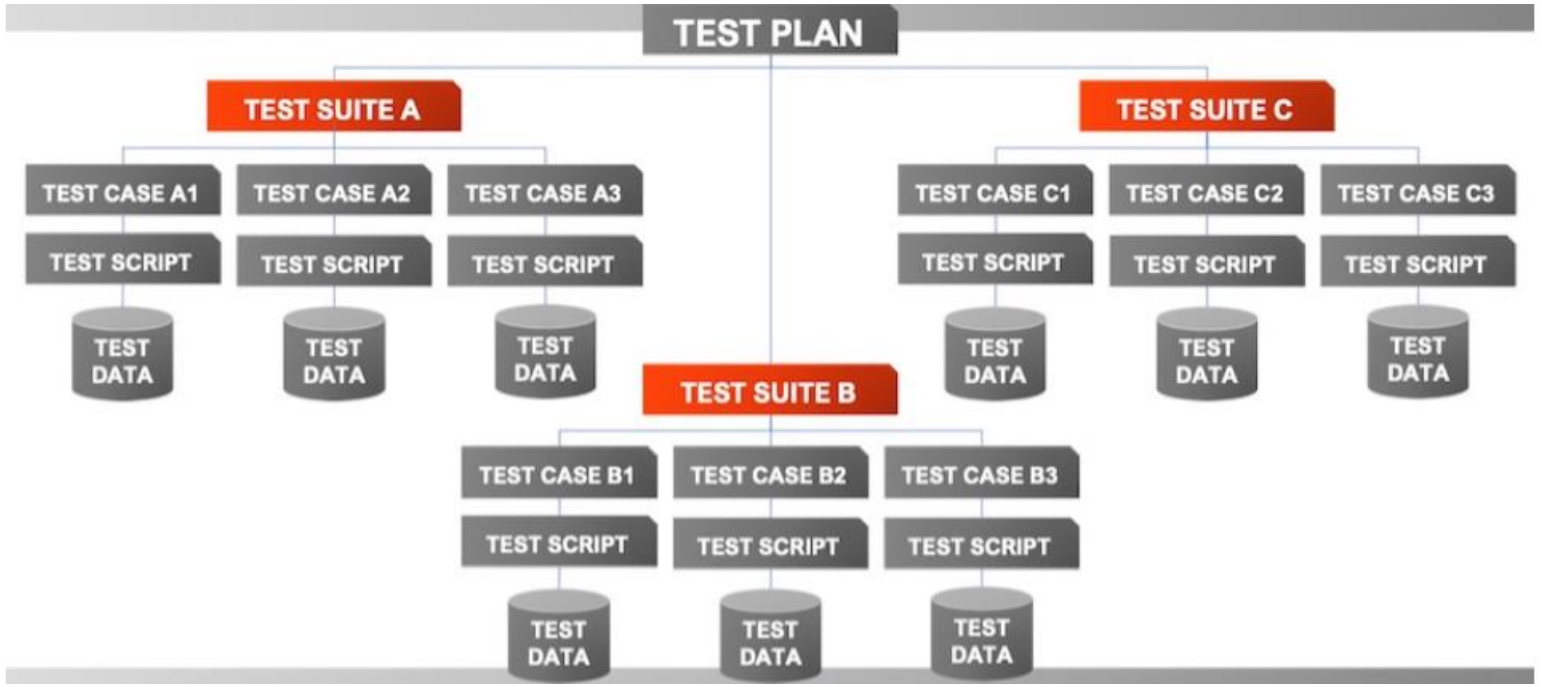
TEST ARTIFACTS...

- A TEST CASE is a documented set of preconditions (prerequisites), procedures (inputs / actions) and post conditions (expected results) which a tester uses to determine whether a system under test satisfies requirements or works correctly



TEST ARTIFACTS...

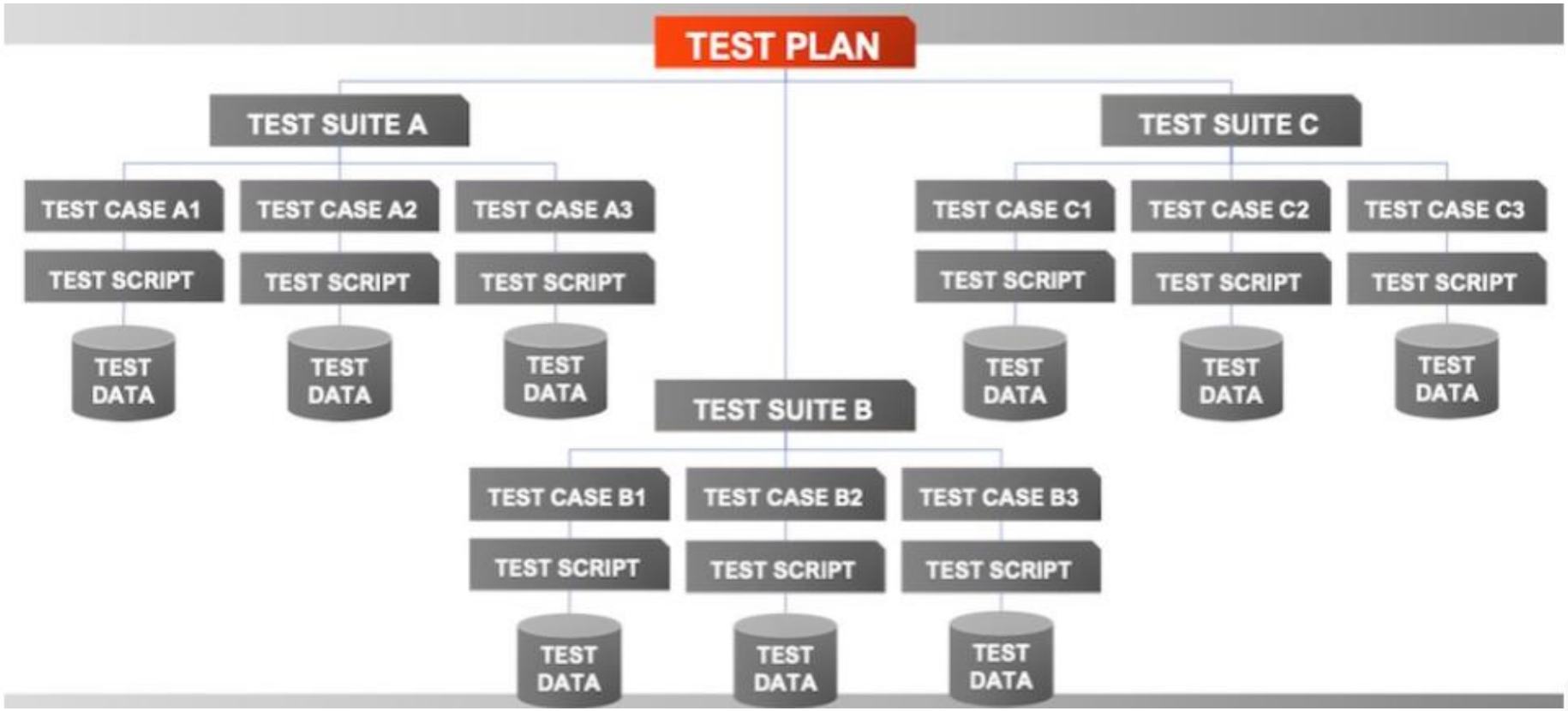
- A TEST SUITE is a collection of test cases. In automated testing, it can mean a collection of test scripts. In a test suite, the test cases / scripts are organized in a logical order. For example, the test case for registration will precede the test case for login.



TEST ARTIFACTS...

- A TEST PLAN is a document describing software testing scope and activities.

  It is the basis for formally testing any software / product in a project.



Test Case Template

Test Suite ID	The ID of the test suite to which this test case belongs.
Test Case ID	The ID of the test case.
Test Case Summary	The summary / objective of the test case.
Related Requirement	The ID of the requirement this test case relates/traces to.
Prerequisites	Any prerequisites or preconditions that must be fulfilled prior to executing the test.
Test Script / Procedure	Step-by-step procedure to execute the test.
Test Data	The test data, or links to the test data, that are to be used while conducting the test.
Expected Result	The expected result of the test.
Actual Result	The actual result of the test; to be filled after executing the test.
Status	Pass or Fail. Other statuses can be ‘Not Executed’ if testing is not performed and ‘Blocked’ if testing is blocked.
Remarks	Any comments on the test case or test execution.
Created By	The name of the author of the test case.
Date of Creation	The date of creation of the test case.
Executed By	The name of the person who executed the test.
Date of Execution	The date of execution of the test.
Test Environment	The environment (Hardware/Software/Network) in which the test was executed.

Test Case Example

Test Suite ID	TS001
Test Case ID	TC001
Test Case Summary	To verify that clicking the Generate Coin button generates coins.
Related Requirement	RS001
Prerequisites	1.User is authorized. 2.Coin balance is available.
Test Script / Procedure	1.Select the coin denomination in the Denomination field. 2.Enter the number of coins in the Quantity field. 3.Click Generate Coin.
Test Data	1.Denominations: 0.05, 0.10, 0.25, 0.50, 1, 2, 5 2.Quantities: 0, 1, 5, 10, 20
Expected Result	1.Coin of the specified denomination should be produced if the specified Quantity is valid (1, 5) 2.A message ‘Please enter a valid quantity between 1 and 10’ should be displayed if the specified quantity is invalid.
Actual Result	1.If the specified quantity is valid, the result is as expected. 2.If the specified quantity is invalid, nothing happens; the expected message is not displayed
Status	Fail
Remarks	This is a sample test case.
Created By	John Doe
Date of Creation	01/14/2020
Executed By	Jane Roe
Date of Execution	02/16/2020
Test Environment	•OS: Windows Y •Browser: Chrome N

LEARN MORE

https://docs.microsoft.com/en-us/shows/Software-Testing-Fundamentals/

Q&A SESSION

Thank You!